

University of Innsbruck
Doctoral Programme Computational Interdisciplinary Modelling
DK CIM

Bylaws and organisational structure of the DK CIM at the University of Innsbruck

Aims

In 2010 the Doctoral Programme Computational Interdisciplinary Modelling (DK CIM) was established at the University of Innsbruck within the framework of the Research Area Scientific Computing. Its purpose is to provide an excellent environment of educational training for brilliant PhD students in the field of interdisciplinary computational modelling utilizing high performance computing. In 2014 the DK CIM started its cooperation with the health & life sciences university UMIT in Hall/Tyrol.

After the completion of all duties set out in the respective PhD curriculum, each PhD student of the DK CIM gets a PhD degree in one of the scientific fields involved in the DK CIM ranging from atmospheric science, chemistry, computer science, engineering science, materials science to mathematics and physics. The PhD students gain international experience through research stays abroad, by attending international conferences, as well as by participating in exchange activities between academia and industry.

Training Programme

The central part of the DK CIM is working on a PhD thesis with a strong focus on research-guided training and high-profile research. In addition the PhD students have to attend a special training programme.

Scientific courses

The PhD students take part in lectures, retreats, research clusters and summer/winter schools. The PhD students present their projects and discuss them with an interdisciplinary audience including external speakers.

Soft skills

The PhD students acquire teaching skills, as well as expertise in scientific ethics, project management and conflict management.

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International experience and collaborations with other research institutions

The PhD students attend international scientific conferences to present and discuss their research work. Based on the network activities of the faculty the PhD students attend universities abroad to work on a project related to their research topics.

Interdisciplinary approach and involved research fields

Research is conventionally based on two main pillars: theory and experiment. Scientific computing has become the third main foundation. Experiments are often limited due to the complexity and the time frames of the investigated processes. Analytical solutions are often impossible to derive due to varying boundary conditions or the required scales and precision. Therefore simulation is often the only option to significantly improve insight into a problem or save tremendous amounts of time and financial resources.

The methodologies of simulations are often similar in various research areas. The aim of the DK CIM is to jointly solve problems related to modelling and to use the knowledge of and interaction between collaborating institutions. The specific field of the DK CIM is computational interdisciplinary modelling. Modelling is the process of formulating a problem in terms of mathematics and computer science to make it amenable to efficient simulations. For practical applications modelling has to be performed at multiple scales.

Computational modelling comprises high performance computing, scientific computing, and scientific visualisation. HPC provides the tool for the calculation, modelling and simulation of complex systems, generally requiring large amounts of computing power and / or data volume. Scientific computing combines numerical mathematics, computer sciences and applied sciences, e.g. engineering sciences or physics. A valuable tool to evaluate the large amounts of data is scientific visualisation, which helps to interpret the numerical results found.

The DK CIM, in which scientists from different disciplines with various research backgrounds work closely together in the field of scientific computing, is unique in Austria. The active interaction of the faculty members from disciplines like mathematics and computer science with those from fields like natural and engineering sciences is crucial in order to seek and work out methodical approaches for front-end applications. This close cooperation boosts research in every way and leads to interesting new results.

In addition the DK CIM deals with aspects related to scientific data visualisation. One of the current key challenges in science and technology is big data. Improved acquisition methods capable of producing high resolution data paired with constantly increasing storage capabilities up to

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exabyte scales, demand novel methods for processing and representing data. More specifically, the visualisation of large datasets in a format useful to users requires new paradigms.

Cooperation with other universities

The DK CIM commits itself to cooperate with other universities. Excellent scientists working in the field of scientific computing from other universities are welcome to join the doctoral programme. Interested applicants are invited to apply for admission to the doctoral programme.

Faculty

The faculty consists of high-profile researchers who are members of the Research Area Scientific Computing. The faculty has a quorum, if at least half of the faculty members are present. The faculty elects the speaker and the deputy speaker by a two-thirds majority of the present quorum. (The former fulfils administrative and financial tasks. On a yearly basis he reports on the progress of the doctoral programme and the results of internal evaluations. On request of the speaker the deputy speaker takes over the day-to-day business.) The faculty decides by a two-thirds majority of the present quorum on the admission of new faculty members, and of PhD students. It nominates members of the scientific advisory board. The faculty elects a female representative, which has to be approved by the steering committee. The faculty approves changes in the by-laws. Each faculty member is main supervisor for at least one PhD student within the programme. The faculty members have to attend faculty meetings and summer/winter schools. The faculty constitutes thesis committees for all PhD students.

Admission of new faculty members

New faculty members are expected to be highly qualified scientists who complement the scientific programme of the DK CIM. They submit an informal application. The admission to join the DK CIM is decided by the faculty a by a two-thirds majority of the present quorum. The general assembly is informed about this decision.

Exclusion of faculty members

The faculty members can resign by own request. Further reasons for excluding faculty members from the DK CIM are (1) unethical scientific behaviour (i.e. scientific fraud), (2) serious violation of rules for good scientific practice (3) neglect of duties as PhD supervisor and mentor, and (4) being permanently without a PhD student. If one of the above reasons applies, the speaker together with

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the deputy speaker has to issue a written statement. If no clarification occurs immediately (point 1 and 2) or within 6 months (point 3 and 4), the exclusion of this member is proposed to the steering committee. The exclusion has to be decided by more than two-thirds of the steering committee members. This decision will be communicated to the general assembly. The excluded faculty member is obliged to submit all required reports concerning work and expenses within the DK CIM to the speaker.

If a faculty member resigns or is excluded, the remaining faculty members shall ensure that the PhD student/s of the excluded faculty member is supervised by another faculty member, if possible. In case this is not feasible, the PhD student/s will be excluded from the DK.

Associated Faculty

High-profile researchers who are either not members of the Research Area Scientific Computing or permanently without a PhD student have the opportunity to contribute as associated faculty members. Associated faculty members will be invited to all DK specific lectures, events and meetings. They will be involved in all decision processes, and will have the possibility to take part in the discussion, but does not include the right to vote. The possibility to take part does not increase the attendance quorum.

PhD students

The DK CIM focuses on PhD students who are of academic excellence and committed to science. They also have to show communication skills, social competence and high team competence.

Recruitment, admission and selection of new PhD students

The PhD students are recruited through a well-defined selection procedure. Announcements of positions as PhD students of the DK CIM follow the *European Charter for Researchers* and the *Code of Conduct for the Recruitment of Researchers*. The PhD positions are advertised through the prospective supervisors (faculty members) on webpages of the universities, on academic job portals and via the international networks of the faculty.

The PhD students have to be enrolled and registered at the University of Innsbruck or the cooperating universities. The applicants should be fluent in written and spoken English. In order to increase the share of female applicants and to take into account special personal circumstances the rules of the DK CIM provide sufficient flexibility to allow the successful completion of the programme in cases such as maternity leaves, special private situations and military / civil services, health or disability reasons.

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The application must include a CV with a short section describing the competence of the candidate and his/her motivation for science, his/her master thesis, a letter of recommendation and a list of publications including oral and poster presentations at conferences. At the first stage the applicant has to give a talk in front of the prospective supervisor, who will decide whether the applicant can present himself in front of the DK CIM community within the next event (winter-, summerschool, retreat or science day. Each invited student gives a short presentation of his/her master thesis. The faculty decides on the admission of a new PhD student by a two-thirds majority. The faculty has a quorum, if at least half of the faculty members are present.

Within the first six months after the acceptance, the main supervisor has to send the thesis agreement to the speaker.

Exclusion of PhD students

Reasons for excluding PhD students from the DK CIM are (1) own request (2) graduation of the doctoral programme (3) removal from the register of PhD students and (4) request of the supervisor. If point (4) applies, the supervisor has to issue a written statement. The speaker has to contact the PhD student, the first and the second supervisor for clarifying matters. If no clarification occurs within one month, the exclusion of this PhD student is proposed to the steering committee. The exclusion has to be approved by the steering committee. The decision will be communicated to the general assembly.

Student board

All PhD students of the doctoral programme are members of the student board, which meets at least once a year and elects the student speaker and the deputy student speaker. The deputy student speaker takes over the day-to-day business on request of the student speaker. The student board discusses suggestions for improvements of the training and research programme and puts them forward to the steering committee, if two-thirds of the PhD students present approve of those.

Scientific manager

The scientific manager supports the speaker in all matters of the scientific coordination, administration and organisation of the training programme and the financial administrative work.

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General assembly

The general assembly consists of all faculty members, PhD students and the scientific manager. It is chaired by the speaker and discusses all issues concerning the educational programme, organisation, budget and PhD student matters. The general assembly has a quorum, if at least half of its members are present. The general assembly takes decisions with a simple majority of the present members. Recommendations are addressed to the steering committee. The general assembly meets at least once a year. A written invitation including the agenda is sent out at least 2 weeks before the date of the meeting. A dismissal of the speaker, as well as changes of the DK CIM rules requires the vote of a two-thirds majority of its members.

Steering committee

The steering committee is formed by the speaker and the deputy speaker, as well as by the student speaker, the deputy student speaker and the scientific manager. A written invitation including the agenda is sent out at least 2 weeks before the date of the meeting. The steering committee decides on all matters of the doctoral programme, the supervision and the approval of the research programme, changes in the training programme, the implementation of measures resulting from evaluations, the exclusion of PhD students on request of the faculty, the approval of a female representative, the approval of members for the scientific advisory board and the utilization of funds. Furthermore, the steering committee has to take into account the suggestions of the student board for possible improvements concerning the training and research programme. The steering committee is entitled to take decisions, if all members are present. Any voting requires a two-thirds majority.

Thesis committee

For each PhD student a thesis committee is constituted by the faculty within the first year after the acceptance. The thesis committee consists of the supervisor and up to two additional members (second supervisor from the faculty and optional third external supervisor) who are experienced scientists. The thesis committee meets at least once a year and discusses the progress related to the thesis (milestone meetings). Meetings are documented in the online supervision system implemented at the University of Innsbruck and the UMIT. A written statement on the work progress is forwarded to the speaker once per year. The thesis committee also helps in conflict situations.

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Any change of supervisors has to be reported to the speaker by the (former) supervisor within one month.

Scientific Advisory Board

The scientific advisory board (SAB) consists of at least three internationally recognized experts in the field of the focal themes of the doctoral programme. It reflects strong international character and gender equality. The faculty nominates the members of the scientific advisory board by a two-third majority. The members of the scientific advisory board have to be approved by the steering committee. The names of the experts are listed on the DK CIM website. The scientific advisory board has an advisory function with the aim to assure the scientific and educational quality of the programme.

Women's representative

A female faculty member acts as the women's representative and takes care of the overall gender policy within the programme. The doctoral programme is fully committed to promote women in science and aims at the best possible gender balance at all levels of staff. This is achieved on the basis of an equal opportunity policy at recruitment and at the subsequent career stages without taking precedence over quality and competence criteria. Female scientists with the same qualification and experience as their male colleagues are preferably accepted.

General commitment

The established rules of the doctoral programme are compatible with the general rules of the University of Innsbruck and the cooperating universities. Decisions are binding to all parties. Rules of good scientific practice are applicable to the faculty and the PhD students. All decisions regarding study related matters of the various curricula within the doctoral programme are taken by the governing body responsible for study law within the universities (detailed regulations are laid down in § 78 Universitätsgesetz 2002/university act 2002).

Gender-related work environment: compatibility of family and career

Universities in Austria are obliged by law to ensure gender equality. At the universities involved and, consequently, in the doctoral programme currently approved measures of gender mainstreaming are implemented, including a gender sensitive employment strategy. Measures are taken to ensure the compatibility of family and work. This includes job opportunities for young parents, as well as the availability of adequate childcare facilities. In order to guarantee a gender

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equal work environment, all gender related matters are closely tuned with the offices for equal opportunities at the universities, drawing from their knowledge and expertise. To raise awareness of gender mainstreaming and to support female researchers in pursuing their scientific career, the PhD curriculum offers seminars dealing with gender aspects and career development.

The faculty is committed to promote women in science and emphasizes gender aspects. In order to increase the fraction of female applicants, the programme provides sufficient flexibility to allow the successful completion of the programme in cases such as maternity leaves and special private situations, e.g. filial leave.

IPR and co-authorship on publications

At the universities intellectual property is considered as an important outcome of a thriving research culture. Therefore, the universities encourage and supports the creation of intellectual property by their PhD students. The universities are owners of intellectual property created by any of their employees, like PhD students, during the course of their employment or arising from a duty related to their employment. The universities make every effort to ensure that a PhD student's right to publish is not unduly restricted by any research contract or process of commercialization. Detailed regulations can be found in § 106 Abs. 2 Universitätsgesetz 2002/university act 2002. Scientists who have made a significant contribution to a research problem are entitled to a co-authorship on publications. If a publication was written by several authors, each individual contribution must be clearly addressed.

Confirmation of participation

After graduating the PhD students obtain a confirmation of their participation in the DK CIM.

Termination of the DK CIM

The DK CIM is terminated, if (1) the faculty members do not continue the programme, (2) the number of PhD students in the programme falls below 10 for a longer period of time, (3) the evaluation by the rectorate is negative twice or (4) the rectorate formally terminates the programme.

Evaluation of the DK CIM

The DK CIM is evaluated by the rectorate of the University of Innsbruck. On request the speaker has to send a report to the responsible member of the rectorate of the University of Innsbruck.

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